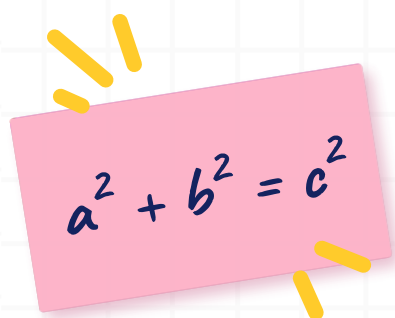
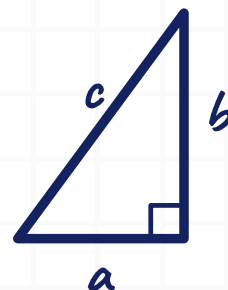
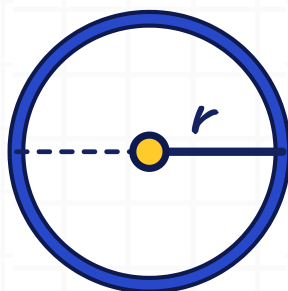


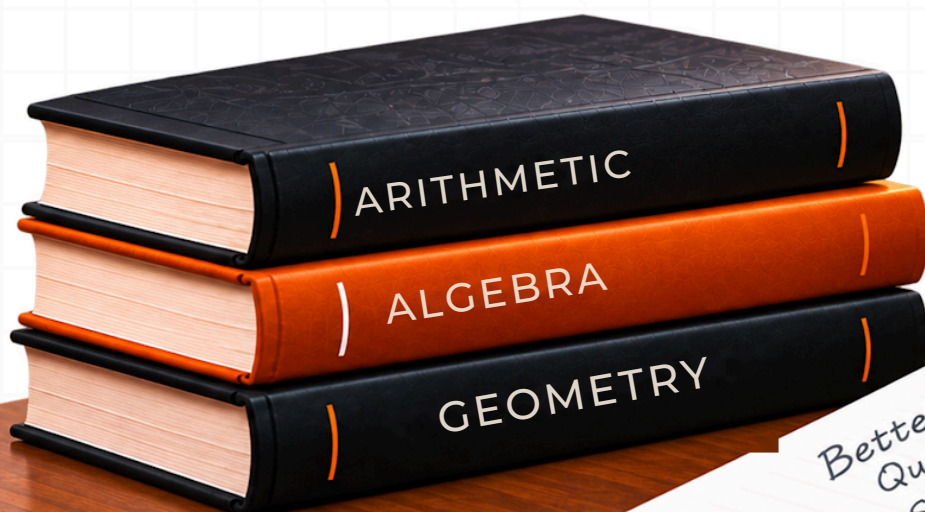
CAT PYQ

Inequalities


$$a^2 + b^2 = c^2$$



$$\underline{D = S \times T}$$



58 Questions

Quantitative Aptitude

Years: 1990-2025

General Instructions

- (i) This collection contains **58 Quantitative Aptitude questions** classified under **Inequalities**, following the supplied CD PYQ sheet.
- (ii) **Coverage:** CAT 1990-2025. Questions are grouped by their source year and sitting, with continuous numbering from **1 to 58**.
- (iii) This collection has **41 multiple choice questions (MCQs)** and **17 Type In The Answer (TITA) questions**. Read every option before choosing the answer. Enter a response for questions marked "Type in the answer."
- (iv) All required shared passages and data sets for the selected questions are included. Blue range labels refer to the question numbers **in this collection**. Read the full passage, chart, table or conditions before answering.
- (v) Each question carries its original year or exam date, sitting where available, and source question number. References distinguish the two CAT 2003 sittings.
- (vi) Use this collection for practice. Follow the timing and marking scheme of the original sitting when attempting a timed exercise.
- (vii) Answer keys and solutions are not included. Passages and questions may continue onto the following page.

CAT 2025 Slot 1 - Questions 1-1

1. The number of distinct pairs of integers (x, y) satisfying the inequalities $x > y \geq 3$ and $x + y < 14$ is

30 Nov 2025, Slot 1, Q54

Type in the answer.

2. The set of all real values of x for which $(x^2 - |x + 9| + x) > 0$, is

30 Nov 2025, Slot 2, Q49

(A) $(-\infty, -3) \cup (3, \infty)$

(B) $(-\infty, -9) \cup (3, \infty)$

(C) $(-9, -3) \cup (3, \infty)$

(D) $(-\infty, -9) \cup (9, \infty)$

3. If a, b, c and d are integers such that their sum is 46, then the minimum possible value of $(a - b)^2 + (a - c)^2 + (a - d)^2$ is

30 Nov 2025, Slot 2, Q62

Type in the answer.

CAT 2025 Slot 3 - Questions 4-4

4. Let p , q and r be three natural numbers such that their sum is 900, and r is a perfect square whose value lies between 150 and 500. If p is not less than $0.3q$ and not more than $0.7q$, then the sum of the maximum and minimum possible values of p is

30 Nov 2025, Slot 3, Q68

Type in the answer.

CAT 2024 Slot 1 - Questions 5-5

5. Let x, y , and z be real numbers satisfying $4(x^2 + y^2 + z^2) = a$, $4(x - y - z) = 3 + a$ The a equals

24 Nov 2024, Slot 1, Q48

- (A) 3 (B) $1\frac{1}{3}$
(C) 4 (D) 1
-

6. All the values of x satisfying the inequality $\frac{1}{x+5} \leq \frac{1}{2x-3}$ are

24 Nov 2024, Slot 2, Q58

(A) $x < -5$ or $\frac{3}{2} < x \leq 8$

(B) $-5 < x < \frac{3}{2}$ or $x > \frac{3}{2}$

(C) $x < -5$ or $x > \frac{3}{2}$

(D) $-5 < x < \frac{3}{2}$ or $\frac{3}{2} < x \leq 8$

CAT 2024 Slot 3 - Questions 7-8

7. The number of distinct real values of x , satisfying the equation $\max \{x, 2\} - \min \{x, 2\} = |x + 2| - |x - 2|$, is

24 Nov 2024, Slot 3, Q54

Type in the answer.

8. The number of distinct integer solutions (x, y) of the equation $|x + y| + |x - y| = 2$, is

24 Nov 2024, Slot 3, Q62

Type in the answer.

CAT 2023 Slot 2 - Questions 9-9

9. Any non-zero real numbers x, y such that $y \neq 3$ and $\frac{x}{y} < \frac{x+3}{y-3}$, Will satisfy the condition.

26 Nov 2023, Slot 2, Q46

(A) $\frac{x}{y} < \frac{y}{x}$

(B) If $y < 0$, and $-x < y$

(C) If $y > 10$, and $-x > y$

(D) If $x < 0$, and $-x < y$

CAT 2023 Slot 3 - Questions 10-10

10. Let n be any natural number such that $5^{n-1} < 3^{n+1}$. Then, the least integer value of m that satisfies $3^{n+1} < 2^{n+m}$ for each such n , is

26 Nov 2023, Slot 3, Q49

Type in the answer.

CAT 2022 Slot 1 - Questions 11-12

11. Let a, b, c be non-zero real numbers such that $b^2 < 4ac$, and $f(x) = ax^2 + bx + c$. If the set S consists of all integers m such that $f(m) < 0$, then the set S must necessarily be

27 Nov 2022, Slot 1, Q53

- (A) the set of all positive integers
- (B) the set of all integers
- (C) either the empty set or the set of all integers
- (D) the empty set

12. The largest real value of a for which the equation $|x + a| + |x - 1| = 2$ has an infinite number of solutions for x is

27 Nov 2022, Slot 1, Q60

- | | |
|--------|-------|
| (A) -1 | (B) 0 |
| (C) 1 | (D) 2 |

CAT 2022 Slot 2 - Questions 13-15

13. In an examination, there were 75 questions. 3 marks were awarded for each correct answer, 1 mark was deducted for each wrong answer and 1 mark was awarded for each unattempted question. Rayan scored a total of 97 marks in the examination. If the number of unattempted questions was higher than the number of attempted questions, then the maximum number of correct answers that Rayan could have given in the examination is

27 Nov 2022, Slot 2, Q54

Type in the answer.

14. The number of distinct integer values of n satisfying $\frac{4 - \log_2 n}{3 - \log_4 n} < 0$, is

27 Nov 2022, Slot 2, Q63

Type in the answer.

15. If a and b are non-negative real numbers such that $a + 2b = 6$, then the average of the maximum and minimum possible values of $(a + b)$ is

27 Nov 2022, Slot 2, Q64

- | | |
|---------|---------|
| (A) 3 | (B) 4 |
| (C) 3.5 | (D) 4.5 |
-

CAT 2022 Slot 3 - Questions 16-16

16. If $c = \frac{16x}{y} + \frac{49y}{x}$ for some non-zero real numbers x and y , then c cannot take the value

27 Nov 2022, Slot 3, Q45

- (A) 60
(C) -70

- (B) -50
(D) -60
-

CAT 2021 Slot 1 - Questions 17-18

17. The number of integers n that satisfy the inequalities $|n - 60| < |n - 100| < |n - 20|$ is

28 Nov 2021, Slot 1, Q54

- (A) 21 (B) 19
(C) 18 (D) 20
-

18. $f(x) = \frac{x^2 + 2x - 15}{x^2 - 7x - 18}$ is negative if and only if

28 Nov 2021, Slot 1, Q59

- (A) $-5 < x < -2$ or $3 < x < 9$ (B) $x < -5$ or $-2 < x < 3$
(C) $-2 < x < 3$ or $x > 9$ (D) $x < -5$ or $3 < x < 9$
-

CAT 2021 Slot 2 - Questions 19-20

19. For all possible integers n satisfying $2.25 \leq 2 + 2^{n+2} \leq 202$, then the number of integer values of $3 + 3^{n+1}$ is:

28 Nov 2021, Slot 2, Q45

Type in the answer.

20. For a real number x the condition $|3x - 20| + |3x - 40| = 20$ necessarily holds if

28 Nov 2021, Slot 2, Q58

(A) $10 < x < 15$

(B) $9 < x < 14$

(C) $7 < x < 12$

(D) $6 < x < 11$

CAT 2021 Slot 3 - Questions 21-21

21. The number of distinct pairs of integers (m,n) , satisfying $|1 + mn| < |m + n| < 5$ is:

28 Nov 2021, Slot 3, Q48

Type in the answer.

CAT 2020 Slot 2 - Questions 22-23

22. If x and y are non-negative integers such that $x + 9 = z$, $y + 1 = z$ and $x + y < z + 5$, then the maximum possible value of $2x + y$ equals

29 Nov 2020, Slot 2, Q72

Type in the answer.

23. if x and y are positive real numbers satisfying $x + y = 102$, then the minimum possible value of $2601\left(1 + \frac{1}{x}\right)\left(1 + \frac{1}{y}\right)$ is

29 Nov 2020, Slot 2, Q76

Type in the answer.

CAT 2020 Slot 3 - Questions 24-24

24. Let m and n be natural numbers such that n is even and $0.2 < \frac{m}{20}, \frac{n}{m}, \frac{n}{11} < 0.5$. Then $m - 2n$ equals

29 Nov 2020, Slot 3, Q59

(A) 3

(B) 1

(C) 2

(D) 4

CAT 2018 Slot 1 - Questions 25-26

25. While multiplying three real numbers, Ashok took one of the numbers as 73 instead of 37. As a result, the product went up by 720. Then the minimum possible value of the sum of squares of the other two numbers is

25 Nov 2018, Slot 1, Q74

Type in the answer.

26. The number of integers x such that $0.25 \leq 2^x \leq 200$ and $2^x + 2$ is perfectly divisible by either 3 or 4, is

25 Nov 2018, Slot 1, Q99

Type in the answer.

CAT 2018 Slot 2 - Questions 27-29

27. The smallest integer n such that $n^3 - 11n^2 + 32n - 28 > 0$ is

25 Nov 2018, Slot 2, Q70

Type in the answer.

28. Let $a_1, a_2, \dots, a_{52}$ be positive integers such that $a_1 < a_2 < \dots < a_{52}$. Suppose, their arithmetic mean is one less than arithmetic mean of $a_2, a_3, \dots, a_{52}$. If $a_{52} = 100$, then the largest possible value of a_1 is

25 Nov 2018, Slot 2, Q78

- (A) 48 (B) 20
(C) 23 (D) 45
-

29. If a and b are integers such that $2x^2 - ax + 2 > 0$ and $x^2 - bx + 8 \geq 0$ for all real numbers x , then the largest possible value of $2a - 6b$ is

25 Nov 2018, Slot 2, Q92

Type in the answer.

CAT 2017 Slot 1 - Questions 30-30

30. For how many integers n , will the inequality $(n - 5)(n - 10) - 3(n - 2) \leq 0$ be satisfied?

26 Nov 2017, Slot 1, Q92

Type in the answer.

31. Let $f(x) = 2x - 5$ and $g(x) = 7 - 2x$. Then $|f(x) + g(x)| = |f(x)| + |g(x)|$ if and only if

26 Nov 2017, Slot 2, Q98

- (A) $\frac{5}{2} < x < \frac{7}{2}$ (B) $x \leq \frac{5}{2}$ or $x \geq \frac{7}{2}$
(C) $x < \frac{5}{2}$ or $x \geq \frac{7}{2}$ (D) $\frac{5}{2} \leq x \leq \frac{7}{2}$
-

32. What values of x satisfy $x^{2/3} + x^{1/3} - 2 \leq 0$?

19 Nov 2006, Q63

- (A) $-8 \leq x \leq 1$ (B) $-1 \leq x \leq 8$
(C) $1 \leq x \leq 8$ (D) $1 \leq x \leq 18$
(E) $-8 \leq x \leq 8$
-

33. If $R = (30^{65} - 29^{65}) / (30^{64} + 29^{64})$, then

20 Nov 2005, Q8

(A) $0 < R \leq 0.1$

(B) $0.1 < R \leq 0.5$

(C) $0.5 < R \leq 1.0$

(D) $R > 1.0$

CAT 2004 - Questions 34-34

34. Each family in a locality has at most two adults, and no family has fewer than 3 children. Considering all the families together, there are more adults than boys, more boys than girls, and more girls than families. Then the minimum possible number of families in the locality is

21 Nov 2004, Q57

- | | |
|-------|-------|
| (A) 4 | (B) 5 |
| (C) 2 | (D) 3 |
-

CAT 2003 Re-test (15 Feb 2004) - Questions 35-37

35. A real number x satisfying $1 - \frac{1}{n} < x \leq 3 + \frac{1}{n}$, for every positive integer n , is best described by

15 Feb 2004, CAT 2003 Re-test, Q83

- (A) $1 < x < 4$ (B) $1 < x \leq 3$
(C) $0 < x \leq 4$ (D) $1 \leq x \leq 3$
-

36. If $13x + 1 < 2z$ and $z + 3 = 5y^2$, then

15 Feb 2004, CAT 2003 Re-test, Q85

- (A) x is necessarily less than y (B) x is necessarily greater than y
(C) x is necessarily equal to y (D) None of the above is necessarily true
-

37. If $|b| \geq 1$ and $x = -|a|b$, then which one of the following is necessarily true?

15 Feb 2004, CAT 2003 Re-test, Q87

- (A) $a - xb < 0$ (B) $a - xb \geq 0$
(C) $a - xb > 0$ (D) $a - xb \leq 0$
-

CAT 2003 Original sitting (23 Nov 2003) - Questions 38-43

38. A leather factory produces two kinds of bags, standard and deluxe. The profit margin is Rs. 20 on a standard bag and Rs. 30 on a deluxe bag. Every bag must be processed on machine A and on Machine B. The processing times per bag on the two machines are as follows:

	Time Required (Hours/bag)	
	Machine A	Machine B
Standard Bag	4	6
Deluxe Bag	5	10

The total time available on machine A is 700 hours and on machine B is 1250 hours. Among the following production plans, which one meets the machine availability constraints and maximizes the profit?

23 Nov 2003, CAT 2003 Original sitting, Q109

- | | |
|---------------------------------------|---------------------------------------|
| (A) Standard 75 bags, Deluxe 80 bags | (B) Standard 100 bags, Deluxe 60 bags |
| (C) Standard 50 bags, Deluxe 100 bags | (D) Standard 60 bags, Deluxe 90 bags |

39. A test has 50 questions. A student scores 1 mark for a correct answer, $-1/3$ for a wrong answer, and $-1/6$ for not attempting a question. If the net score of a student is 32, the number of questions answered wrongly by that student cannot be less than

23 Nov 2003, CAT 2003 Original sitting, Q114

- | | |
|-------|--------|
| (A) 6 | (B) 12 |
| (C) 3 | (D) 9 |

40. Let a, b, c, d be four integers such that $a+b+c+d = 4m+1$ where m is a positive integer. Given m , which one of the following is necessarily true?

23 Nov 2003, CAT 2003 Original sitting, Q131

- | | |
|--|--|
| (A) The minimum possible value of $a^2 + b^2 + c^2 + d^2$ is $4m^2 - 2m + 1$ | (B) The minimum possible value of $a^2 + b^2 + c^2 + d^2$ is $4m^2 + 2m + 1$ |
| (C) The maximum possible value of $a^2 + b^2 + c^2 + d^2$ is $4m^2 - 2m + 1$ | (D) The maximum possible value of $a^2 + b^2 + c^2 + d^2$ is $4m^2 + 2m + 1$ |

41. If the product of n positive real numbers is unity, then their sum is necessarily

23 Nov 2003, CAT 2003 Original sitting, Q139

- | | |
|-------------------------|------------------------|
| (A) a multiple of n | (B) equal to $n + 1/n$ |
| (C) never less than n | (D) a positive integer |

42. Given that $-1 \leq v \leq 1$, $-2 \leq u \leq -0.5$ and $-2 \leq z \leq -0.5$ and $w = vz/u$, then which of the following is necessarily true?

23 Nov 2003, CAT 2003 Original sitting, Q143

- | | |
|--------------------------|---------------------------|
| (A) $-0.5 \leq w \leq 2$ | (B) $-4 \leq w \leq 4$ |
| (C) $-4 \leq w \leq 2$ | (D) $-2 \leq w \leq -0.5$ |

43. If x, y, z are distinct positive real numbers the $(x^2(y+z) + y^2(x+z) + z^2(x+y))/xyz$ would always be

- (A) Less than 6
(B) greater than 8
(C) greater than 6
(D) Less than 8
-

CAT 2001 - Questions 44-47

44. If $x > 5$ and $y < -1$, then which of the following statements is true?

CAT 2001, Q4

- (A) $(x + 4y) > 1$ (B) $x > -4y$
(C) $-4x < 5y$ (D) None of these
-

45. x and y are real numbers satisfying the conditions $2 < x < 3$ and $-8 < y < -7$. Which of the following expressions will have the least value?

CAT 2001, Q14

- (A) x^2y (B) xy^2
(C) $5xy$ (D) None of these
-

46. If a, b, c and d are four positive real numbers such that $abcd = 1$, what is the minimum value of $(1 + a)(1 + b)(1 + c)(1 + d)$?

CAT 2001, Q27

- (A) 4 (B) 1
(C) 16 (D) 18
-

47. Let x and y be two positive numbers such that $x + y = 1$. Then the minimum value of $(x + \frac{1}{x})^2 + (y + \frac{1}{y})^2$ is

CAT 2001, Q37

- (A) 12 (B) 20
(C) 12.5 (D) 13.3
-

48. If $x > 2$ and $y > -1$, then which of the following statements is necessarily true?

CAT 2000, Q62

(A) $xy > -2$

(B) $-x < 2y$

(C) $xy < -2$

(D) $-x > 2y$

CAT 1998 - Questions 49-50

49. You can collect as many rubies and emeralds as you can. Each ruby is worth Rs. 4 crore and each emerald is worth Rs. 5 crore. Each ruby weighs 0.3 kg. And each emerald weighs 0.4 kg. Your bag can carry at the most 12 kg. What should you collect to get the maximum wealth?

CAT 1998, Q82

- | | |
|-------------------------------|-------------------|
| (A) 20 rubies and 15 emeralds | (B) 40 rubies |
| (C) 28 rubies and 9 emeralds | (D) None of these |
-

50. My son adores chocolates. He likes biscuits. But he hates apples. I told him that he can buy as many chocolates he wishes. But then he must have biscuits twice the number of chocolates and should have apples more than biscuits and chocolates together. Each chocolate cost Re 1. The cost of apple is twice the chocolate and four biscuits are worth one apple. Then which of the following can be the amount that I spent on that evening on my son if number of chocolates, biscuits and apples brought were all integers?

CAT 1998, Q84

- | | |
|------------|-------------------|
| (A) Rs. 34 | (B) Rs. 33 |
| (C) Rs. 8 | (D) None of these |
-

CAT 1996 - Questions 51-52

51. Which of the following values of x do not satisfy the inequality $(x^2 - 3x + 2 > 0)$ at all?

CAT 1996, Q107

(A) $1 \leq x \leq 2$

(B) $-1 \geq x \geq -2$

(C) $0 \leq x \leq 2$

(D) $0 \geq x \geq -2$

52. Out of two-thirds of the total number of basketball matches, a team has won 17 matches and lost 3 of them. What is the maximum number of matches that the team can lose and still win more than three-fourths of the total number of matches, if it is true that no match can end in a tie?

CAT 1996, Q135

(A) 4

(B) 6

(C) 5

(D) 3

CAT 1993 - Questions 53-53

53. Let $x < 0$, $0 < y < 1$, $z > 1$. Which of the following may be false?

CAT 1993, Q90

(A) $x^2 - z^2$ has to be positive.

(B) yz can be less than one.

(C) xy can never be zero.

(D) $y^2 - z^2$ is always negative.

CAT 1991 - Questions 54-54

54. The number of integers n satisfying $-n+2 \geq 0$ and $2n \geq 4$ is

CAT 1991, Q71

(A) 0

(B) 1

(C) 2

(D) 3

55. The value of $\frac{(1 - d^3)}{(1 - d)}$ is

CAT 1990, Q24

- (A) > 1 if $d > -1$ (B) > 3 if $d > 1$
(C) > 2 if $0 < d < 0.5$ (D) < 2 if $d < -2$

Questions 56 to 58

A dealer deals only in colour TVs and VCRs. He wants to spend up to Rs.12 lakhs to buy 100 pieces. He can purchase a colour TV at Rs.10,000 and a VCR at Rs.15,000. He can sell a colour TV at Rs.12,000 and a VCR at Rs.17,500. His objective is to maximize profits. Assume that he can sell all the items that he stocks.

56. For the maximum profit, the number of colour TVs and VCRs that he should respectively stock are

CAT 1990, Q26

- (A) 80, 20 (B) 20, 80
(C) 60, 40 (D) None of these

57. If the dealer would have managed to get an additional space to stock 20 more items, then for maximizing profit, the ratio of number of VCRs and number of TVs that he should stock is

CAT 1990, Q27

- (A) 7 : 3 (B) 0
(C) 1 : 2 (D) None of these

58. The maximum profit, in rupees lakh, the dealer can earn from his original stock if he can sell a colour TV at Rs. 12200 and VCR at Rs.18300 is

CAT 1990, Q28

- (A) 2.64 (B) 2.49
(C) 2.72 (D) 2.87

- End of PYQ Collection -